

Attorney Docket No. AHUG.015
Serial No. 10/671,141
Preliminary Amendment

Claim Amendments

1. (Currently Amended) An apparatus for joining a plurality of cylindrical rod sections together, comprising:
 - a plug assembly fixedly engaged to a first rod proximate end and having a plurality of first splines and a plurality of first connectors;
 - a socket assembly fixedly engaged to a second rod distal end and having a plurality of receptacles adapted to receive the plurality of splines and a plurality of second connectors of the plug assembly;
 - a securing device for securing the plug assembly to the socket assembly;wherein the plug assembly may be joined to and the socket assembly by the securing device may be joined in N a plurality of orientations where N is equal to the number of splines so that, in each of the plurality of orientations, when the plurality of splines in the plug assembly mate with the plurality of receptacles in the socket assembly, the plurality of first connectors engage the plurality of second connectors.
2. (Original) The apparatus of claim 1, wherein the plurality of splines further comprises a center spline and a plurality of outer splines of equal dimensions, the outer splines sharing a common longitudinal axis with the center spline and having symmetry about the common longitudinal axis, and where N is equal to the number of outer splines.
3. (Original) The apparatus of claim 1, wherein the securing device is a coupling collar adapted for connecting it to the plug assembly and the socket assembly, the coupling collar initially engaged with the plug assembly.

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4. (Original) The apparatus of claim 1, wherein the plug assembly further comprises fine threads.
5. (Original) The apparatus of claim 1, wherein the socket assembly further comprises coarse threads.
6. (Original) The apparatus of claim 5, wherein the threads of the socket assembly are tapered.
7. (Currently Amended) The apparatus of claim 1, wherein the cylindrical rod sections are connectable in two distinct orientations.
8. (Currently Amended) The apparatus of claim 1, wherein the cylindrical rod sections are connectable in three distinct orientations.
9. (Currently Amended) The apparatus of claim 1, wherein the cylindrical rod sections are connectable in four or more distinct orientations.
10. (Original) The apparatus of claim 1, further comprising at least one conduit containing a wire adapted to carry an electrical current.
11. (Original) The apparatus of claim 1, further comprising at least one conduit containing material adapted to carry an optical signal.
12. (Cancelled)
13. (Cancelled)
14. (Cancelled)
15. (Cancelled)
16. (Cancelled)
17. (Original) The apparatus of claim 1 wherein the cylindrical sections are connectable in a plurality of distinct orientations.

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18. (Currently Amended) An apparatus for providing power to a subterranean environment, comprising:

a drilling an assembly containing a plurality of cylindrical rod sections;

a plurality of cylindrical joints for connecting the plurality of cylindrical rod sections together, the each cylindrical joint comprising:

a plug assembly fixedly engaged to a rod proximate end and having a plurality of splines;

a socket assembly fixedly engaged to a rod distal end and having a plurality of receptacles, the plurality of receptacles of one rod section's socket assembly adapted to receive the plurality of splines of another rod section's the plug assembly;

at least one a plurality of conduit transmission means running the length of the apparatus;

a securing device for securing the plug assembly of one rod section to the socket assembly of another rod section; and

wherein the plug assembly of one rod section and the socket assembly of another rod section may be joined in N orientations where N is equal to the number of splines; and

wherein the plurality of transmission means are aligned for connectivity when the plug assembly of one rod section is joined to the socket assembly of another rod section.

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19. (Original) The apparatus of claim 18, wherein the plurality of splines further comprises a center spline and a plurality of outer splines of equal dimensions, the outer splines sharing a common longitudinal axis with the center spline and having symmetry about the common longitudinal axis, and wherein N is equal to the number of outer splines.
20. (Original) The apparatus of claim 19, wherein the securing device is a coupling collar adapted for connection to the plug assembly and the socket assembly, the coupling collar initially engaged with the plug assembly.
21. (Original) The apparatus of claim 19, wherein the plug assembly further comprises fine threads.
22. (Original) The apparatus of claim 19, wherein the socket assembly further comprises coarse threads.
23. (Original) The apparatus of claim 22, wherein the threads of the socket assembly are tapered.
24. (Currently Amended) The apparatus of claim 19, wherein the cylindrical rod sections are connectable in two distinct orientations.
25. (Currently Amended) The apparatus of claim 19, wherein the cylindrical rod sections are connectable in three distinct orientations.
26. (Currently Amended) The apparatus of claim 19, wherein the cylindrical rod sections are connectable in four or more distinct orientations.
27. (Original) The apparatus of claim 19, further comprising at least one conduit containing a wire adapted to carry an electrical current.

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28. (Original) The apparatus of claim 19, further comprising at least one conduit containing material adapted to carry an optical signal.

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Original) The apparatus of claim 19 wherein the cylindrical sections are connectable in a plurality of orientations.

35. (Currently Amended) A method of using a cylindrical joint to join two cylindrical rod sections together, comprising:

using a first cylindrical rod section with a proximate end having a plug assembly attached and a second cylindrical rod section with a distal end having a socket assembly attached, positioning the first cylindrical rod section coaxially with the second cylindrical rod section;

aligning the first cylindrical rod section with the second cylindrical rod section; engaging the plug assembly of the first cylindrical rod section into the socket assembly of the second cylindrical rod section; and securing the first cylindrical rod section to the second cylindrical rod section.

36. (Currently Amended) The method of claim 35 wherein the positioning step further comprises: positioning the first cylindrical rod section coaxially with the second

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cylindricalrod section such that the proximate end of the first cylindricalrod section is in close proximity with the distal end of the second cylindricalrod section.

37. (Currently Amended) The method of claim 35 wherin the positioning step further comprises:

aligning the first cylindricalrod section with the second cylindricalrod section by rotating one or both cylindricalrod sections such that the plug assembly outer splines of the first cylindricalrod section are positioned to properly mate with the ~~receptacle~~ receptacles in the socket assembly of the second cylindricalrod section.

38. (Currently Amended) The method of claim 35 wherein the first cylindricalrod section is vertically above the second cylindricalrod section.

39. (Currently Amended) The method of claim 35 wherein a pair of electrical connectors are electrically coupled when the plug assembly of the first cylindricalrod section is inserted into the socket assembly of the second cylindricalrod section.

40. (Currently Amended) The method of claim 35 wherin a pair of optical connectors are optically coupled when the plug assembly of the first cylindricalrod section is inserted into the socket assembly of the second cylindricalrod section.

41. (Currently Amended) The method of claim 35 wherin the coupling collar of the first cylindricalrod section is used to secure the first cylindricalrod section to the second cylindricalrod section.

42. (Cancelled)

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

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46. (Cancelled)

47. (Currently Amended) In a drill-string apparatus of the type comprising a plurality of cylindrical rod sections arranged in end to end relation from a location above the ground to a lower location adjacent to an orientable tool connected to a bottom end of the drill-string apparatus and wherein the adjacent ends of the cylindrical rod sections are connected to each other to form a plurality of spaced cylindrical rod joints extending downwardly from the ground to the tool, wherein each cylindrical rod section is provided with a lower end having a downwardly projecting extension plurality of splines and an upper end having a complementary recess plurality of receptacles which is in alignment with and corresponds with the downwardly projecting extension plurality of splines on the lower end of the same cylindrical rod section, and wherein each cylindrical rod joint comprises an upper cylindrical rod section having its downwardly projecting extensions plurality of splines received in the corresponding recess plurality of receptacles in the next adjacent lower cylindrical rod section and wherein the extensionsplurality of splines and the recesses the plurality of receptacles can fit together in more than one orientation, wherein the adjacent ends of the sections are threaded and wherein an internally threaded collar is received over the threaded ends to hold the sections of each cylindrical rod joint securely together, and wherein a plurality of connectors are aligned for connectivity when the splines of the upper rod section are received in the corresponding receptacles in the next adjacent rod section.

48. (Currently Amended) A cylindrical rod joint as set forth in claim 47 wherein the upper cylindrical rod section and lower cylindrical rod scction are provided with keyways which

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are symmetrically related with respect to the longitudinal axis of the drill string and wherein keys are affixed to the keyways of the upper drill section and are adapted to fit into the keyways of the lower cylindricalrod section.

49. (Currently Amended) A cylindricalrod joint as set forth in claim 47 wherein the upper cylindricalrod section is provided with at least three downwardly extending legs which are symmetrically arranged with respect to the longitudinal axis of the drill string and wherein the lower cylindricalrod section is provided with a corresponding number of recesses arranged so as to receive the legs of the upper cylindricalrod section.

50. (Currently Amended) An apparatus for connecting a plurality of cylindricalrod sections together comprising:

a first cylindricalrod section;
a second cylindricalrod section removably connected to the first cylindricalrod section; and

wherein the first cylindricalrod section and the second cylindricalrod section are connectable in a plurality of distinct orientations so that when connected in one of the plurality of distinct orientations a first transmission means of the first rod section is engaged with a second transmission means in the second rod section.

51. (Currently Amended) The apparatus of claim 50 wherein the connection between the first cylindricalrod section and the second cylindricalrod section comprises: a means for connecting the first cylindricalrod section to the second cylindricalrod section in a plurality of distinct orientations.

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52. (Currently Amended) The apparatus of claim 50 wherein the connection between the first cylindrical rod section and the second cylindrical rod section comprises:

a plug assembly having a plurality of splines affixed to the first cylindrical rod section;

a socket assembly having a plurality of receptacles adapted to receive the plurality of splines of the plug assembly, the socket assembly being affixed to the second cylindrical rod section; and

a securing device for securing the plug assembly to the socket assembly.

53. (Original) The apparatus of claim 52, wherein the securing device is a coupling collar adapted for connection to the plug assembly and the socket assembly, the coupling collar initially engaged with the plug assembly.

54. (Original) The apparatus of claim 53, wherein the plug assembly further comprises fine threads.

55. (Original) The apparatus of claim 53, wherein the socket assembly further comprises coarse threads.

56. (Original) The apparatus of claim 55, wherein the threads of the socket assembly are tapered.

57. (Currently Amended) The apparatus of claim 52, wherein the cylindrical rod sections are connectable in two distinct orientations.

58. (Currently Amended) The apparatus of claim 52, wherein the cylindrical rod sections are connectable in three distinct orientations.

59. (Currently Amended) The apparatus of claim 52, wherein the cylindrical rod sections are connectable in four or more distinct orientations.

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60. (Original) The apparatus of claim 52, further comprising at least one conduit containing a wire adapted to carry an electrical current.

61. (Original) The apparatus of claim 52, further comprising at least one conduit containing material adapted to carry an optical signal.

62. (Cancelled)

63. (Cancelled)

64. (Cancelled)

65. (Cancelled)

66. (Cancelled)

67. (Cancelled)

68. (Cancelled)

69. (Cancelled)

70. (Cancelled)

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On October 20, 2005
Date

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